



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/816,299	04/01/2004	Nelson H. Oliver	2003P18822US	8586

7590 12/05/2005

Siemens Corporation
Intellectual Property Department
170 Wood Avenue South
Iselin, NJ 08830

EXAMINER

DOUGHERTY, THOMAS M

ART UNIT	PAPER NUMBER
----------	--------------

2834

DATE MAILED: 12/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/816,299	Applicant(s) OLIVER, NELSON H.	
	Examiner Thomas M. Dougherty	Art Unit 2834	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>404</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2 and 20 are rejected under 35 U.S.C. 102(a) as being anticipated by Azuma et al. (US 2003/0083573). Azuma et al. show (fig. 1) in a matching layer of an ultrasound transducer, the matching layer (2) including a resin, an improvement comprising: a hafnium filler (see paragraph 0028).

While Azuma doesn't note in his invention that the hafnium filler comprises hafnia powder he does note that his invention replaces the use of such powder at paragraph 0006.

Azuma et al. show (fig. 1) an ultrasound transducer for acoustic use adjacent to tissue, the ultrasound transducer comprising: a transducer element (1), and an acoustic impedance matching layer (2) adjacent the transducer element (1), the matching layer (2) containing a hafnium compound, see paragraph 0028.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

Art Unit: 2834

the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Azuma et al. (US 2003/0083573) in view of Fujii et al. (JP 60-223299). Given the invention of Azuma et al. as noted above, they do not show the matching layer being an intermediate matching layer between an upper matching layer and a lower matching layer.

Fujii et al. show (fig. 3) an acoustic matching layer comprised of three layers. They do not show use of hafnium as a component of any of the three layers.

It would have been obvious to one having ordinary skill in the art to employ the three layers of Fujii et al. in the device of Azuma et al. at the time of their invention since this is noted as improving the response properties of the device. See Fujii's et al.

PURPOSE.

Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Azuma et al. (US 2003/0083573) in view of Sakamoto et al. (JP 3-295547). Given the invention of Azuma et al. it is not clear whether or not the resin with the filler comprises a castable material.

Sakamoto et al. note that their acoustic matching material 12 is cast into the recessed surface of a piezoelectric actuator. They don't specifically note use of hafnium.

It would have been obvious to one having ordinary skill in the art to employ the castable acoustic matching layer of Sakamoto et al. in the device of Azuma et al. at the

Art Unit: 2834

time of their invention since this improves the characteristics of the ultrasonic probe as noted in the PURPOSE of Sakamoto et al.

Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Azuma et al. (US 2003/0083573) in view of Fujii et al. (JP 60-223299) and further in view of in view of Sakamoto et al. (JP 3-295547). Given the combined invention of Azuma et al. and Fujii et al. noted above, they do not show the matching layer being an intermediate matching layer between an upper matching layer and a lower matching layer. However they do not show a cast material. Sakamoto notes use of a castable material but not three layers of acoustic matching material or use of hafnium.

It would have been obvious to one having ordinary skill in the art to employ the castable acoustic matching layer of Sakamoto et al. in the device of Azuma et al. at the time of their invention since this improves the characteristics of the ultrasonic probe as noted in the PURPOSE of Sakamoto et al.

Claims 3-10, 12, and 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Azuma et al. (US 2003/0083573). Given the invention of Azuma et al. as noted above, they do not show the hafnium filler comprises only particles of less than 7 microns maximum dimension and the matching layer has an acoustic impedance of about 3-8 MRayl. They do not show the particles are less than 1 micron and the acoustic impedance is less than about 4 MRayl. They do not show the particles are greater than 5 microns and the acoustic impedance is greater than about 6 MRayl. They do not show the acoustic impedance is about 5

Art Unit: 2834

MRayl. They do not note the hafnium filler comprises 10-40% by volume of the matching layer. They do not show hafnium filler comprises 15-25% by volume of the matching layer. They do not show the matching layer has an ultrasound strip velocity of about 1600-1900 meters per second. They do not show the matching layer has an ultrasound strip velocity of about 1750 meters per second. They do not show the matching layer has a maximum thickness of less than about 150 microns. They do not show loading a resin with hafnium compound wherein this comprises loading with hafnia powder at about 10-40% by volume; or wherein this comprises loading with hafnia powder at about 15-25% by volume.

It would have been obvious to one having ordinary skill in the art to adjust the Hafnium fillers' percentages to those which are claimed in order to achieve the desired acoustic impedances cited, to achieve the desired velocities cited and to employ the cited thicknesses to achieve a like outcome, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

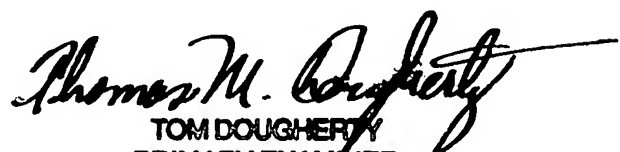
Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The remaining prior art cited reads on some aspects of the claimed invention.

Direct inquiry to Examiner Dougherty at (571) 272-2022.

tmd
tmd

November 28, 2005


TOM DOUGHERTY
PRIMARY EXAMINER